WATER BOARD 2017 SPRING TREATMENT SUMMARY FOR APRIL 3 – APRIL 10, 2017

Prepared by Water Board personnel, April 10, 2017.

During the time period of April 3, to April 10, 2017, the Water Board's contractor, TKT Consulting LLC (TKT), continued to perform 2017 Spring Treatment activities at Leviathan Mine. TKT continued siphoning AMD from Pond 2 South to Pond 3 and neutralizing the AMD with the Rotating Cylinder Treatment System (RCTS) . TKT discharged neutralized AMD to Leviathan Creek on April 3rd, 5th, 7th, and 9th. 2017 Spring Treatment discharge volumes can be seen in Table 1.

From April 3, to April 6, 2017, U.S. Forest Service (USFS) Road 31052 from U.S. Highway 395 to approximately the hairpin turn above the confluence of Aspen and Leviathan Creeks was mostly packed dirt with some small areas of rutting caused by storm water runoff. Beyond the hairpin turn the road was muddier with some minor rutting. On April 7, 2017, rain and snow moved into the area which made the road muddier. On April 8, 2017, the site received approximately 12-inches of snow and the road from approximately the California-Nevada state line to the site became covered in snow. At all times the road remained passable with a four-wheel-drive vehicle. No damage to the roadbed occurred due to travel on the road during this time period. Water Board personnel have been in contact with USFS personnel to keep them apprised of road conditions.

Conditions onsite during this time period remained extremely challenging. Morning temperatures were below freezing and often warmed significantly during the day. April 7th and 8th were particularly challenging as the snow and rain were heavy at times. Areas where snow removal occurred remained muddy making work and travel difficult. Unplowed areas of the site remained mostly covered by 1-3 feet of snow and continue to necessitate a large amount of labor carrying equipment by hand. The snow deposited on April 7th and 8th began to melt on April 9th making the site very muddy. Pond 3 remained ice free through April 7th but became partially ice covered on April 8th. TKT continued to use multiple pumps to expedite the mixing process. Ponds 1, 2 North, and 2 South remained mostly ice covered. See photos 1-4.

Photo 1 – TKT neutralizing AMD in Pond 3 with the RCTS

Photo 2 – TKT neutralizing AMD in Pond 3 with the RCTS, heavy snow

Photo 3 – Siphon from Pond 2 South into overflow structure to Pond 3 and RCTS

Photo 4 – TKT neutralizing AMD in Pond 3 with the RCTS following the April 7th and 8th storm

Additional sample results for untreated pond water samples and discharge samples became available and have been added to Tables 2 and 3. TKT continued to collect untreated pond water samples and discharge samples as necessary; analytical results for these samples are still pending and will be added to Tables 2 and 3 when they become available.

The valve that allows AMD to enter Pond 1 remains closed. Pond 1 was isolated on March 20, 2017 because less than one inch of remaining freeboard was available. AMD from the Adit and Pit Underdrain continue to be conveyed to Ponds 2 North and 2 South. The USGS measurement of Pond stage listed as "Pond 1 Stage" currently measures the stage in Ponds 2 North and 2 South since Pond 1 is isolated. The stage of water contained in Pond 2 North and 2 South, as measured by the USGS and described above, can be seen on Figure 1. Additionally, Water Board and TKT personnel have begun collecting manual measurements of Pond 2 South freeboard. These manual measurements can be seen in Table 4 and appear to better represent actual site conditions than the USGS measurement viewed online due to the effect of ice on the ponds. The elevation of water contained in Pond 2 South, as of April 10, 2017, is immediately below the overflow elevation. If Pond 2 South were to overflow, the overflow would be conveyed directly to the RCTS for treatment as occurs with the current siphon lines. The available freeboard in Pond 2 North as of April 10, 2017 is approximately 0.08 feet. The combined flow of AMD from the Adit and Pit Underdrain (PUD) as of April 10, 2017 is approximately 107 gallons per minute which is an increase of approximately 22 gallons per minute from the combined flow observed one week ago.

The Water Board's contractor, TKT, intends to continue AMD neutralization in Pond 3 throughout the upcoming week. A chance of rain and snow showers is forecasted for later in this week. Water Board personnel will continue to visit the site throughout the upcoming week and prepare the next 2017 Spring Treatment summary on April 17, 2017.

Table 1
2017 Spring Treatment, Leviathan Mine
Pond 3 Estimated Discharge Volume

Date	Estimated Discharge Volume (gallons)
3/4/2017	380,000
3/10/2017	430,000
3/13/2017	326,000
3/16/2017	430,000
3/18/2017	467,000
3/20/2017	394,000
3/22/2017	429,000
3/24/2017	371,000
3/26/2017	399,000
3/28/2017	363,000
3/30/2017	394,000
4/1/2017	338,000
4/3/2017	359,000
4/5/2017	339,000
4/7/2017	428,000
4/9/2017	511,000
Total Spring Treatment Discharge Volume	**6,358,000**

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Table 2
2017 Spring Treatment, Leviathan Mine
Untreated Pond Water Sample Results

SAMPLE ID	Sample Description	SAMPLE DATE	pH	TEMP (°C)	Aluminum			Arsenic			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Nickel			Selenium			Sulfate (as SO_4)			Total Dissolved Solids			Zinc		
USEPA Daily Maximum Discharge Criteria			6.0 - 9.0		4			0.34			0.009			NP			0.97			NP			0.026			2			0.136			NP			NP			0.84			NP			NP			NP			0.21		
USEPA 4-Day Average Discharge Criteria			NP		2			0.15			0.004			NP			0.31			NP			0.016			1			0.005			NP			NP			0.094			0.005			NP			NP			0.21		
					Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ
001P3001	Untreated water in Pond 3	2/24/2017	4.27	1.74	7.5	L		ND, 0.001			0.004			95.3			ND, 0.005			0.145	L		0.086			0.30			ND, 0.001			21.1			0.869			0.332			0.002			362	D		513			0.10		
001P1002	Untreated water in Pond 1	2/24/2017	3.05	0.09	36.2	D		0.188			0.004			90.4			0.075			0.22	D		0.127			36.3			ND, 0.001			7.6			1.24			0.577			0.001			587	D		789			0.13		
003P2S004	Untreated water in Pond 2 South	3/7/2017	2.23	0.30	98.7	D		0.894			0.009			53.2			0.236			0.550			0.341			147			ND, 0.001			12.5			2.99			1.47			0.002			1140	D		1680			0.29		
004P2S006	Untreated water in Pond 2 South	3/10/2017	2.69	0.0	67.9			0.403			0.007			39.8			0.170			0.425			0.253			88.7			ND, 0.001			10.3			2.20			1.12			0.003			868	D		1240			0.22		
006P2S008	Untreated water in Pond 2 South	3/14/2017	2.63	0.0	68.9	D		0.256			0.007			38.8			0.180			0.417			0.277			75.8			ND, 0.001			9.9			2.18			1.08			0.002			718	D		1110			0.20		
008P2S010	Untreated water in Pond 2 South	3/17/2017	2.50	0.0	40.9	L		0.06			0.004			23.6			0.087			0.223			0.148			36.3			ND, 0.001			5.8			1.18			0.582			ND, 0.001			450	D		644			0.12		
010P2S012	Untreated water in Pond 2 South	3/19/2017	2.59	0.0	30.8	L		0.035			0.003			17.0			0.064			0.171			0.118			24.5			ND, 0.001			4.4			0.877			0.442			0.002			342	D		469			0.09		
012P2S014	Untreated water in Pond 2 South	3/21/2016	2.36	0.0	22.3	L		0.027			0.002			14.0			0.045			0.123			0.085			17.5			ND, 0.001			3.1			0.649			0.318			ND, 0.001			245			351			0.06		
013P2S016	Untreated water in Pond 2 South	3/22/2017	2.83	0.0	25.0	L		0.077			0.003			15.4			0.058			0.145			0.100			25.9			ND, 0.001			3.9			0.821			0.388			ND, 0.001			286	D		395			0.08		
014P2S018	Untreated water in Pond 2 South	3/24/2017	3.03	0.0	20.6	L		0.032			0.002			13.1			0.047			0.127			0.089			17.8			ND, 0.001			3.2			0.687			0.334			ND, 0.001			231			308			0.07		
015P2S020	Untreated water in Pond 2 South	3/26/2017	2.97	0.0	30.6	L		0.059			0.003			18.7			0.059			0.152			0.107			25.4			ND, 0.001			4.0			0.830			0.414			ND, 0.001			323	D		438			0.08		
016P2S022	Untreated water in Pond 2 South	3/28/2017	2.93	0.0	29.3			0.088			0.003			18.8			0.071			0.163			0.114			30.8			ND, 0.001			4.5			0.934			0.438			ND, 0.001			293	D		419			0.09		
017P2S024	Untreated water in Pond 2 South	3/30/2017	2.32	0.0	48.2			0.406			0.004			30.3			0.113			0.259			0.173			72.9			ND, 0.001			7.7			1.53			0.677			ND, 0.001			569	D		778			0.14		
017P2D025	Untreated water in Pond 2 South, Duplicate Sample	3/30/2017	2.32	0.0	48.1			0.426			0.004			25.9			0.119			0.262			0.180			72.1			ND, 0.001			7.3			1.50			0.706			ND, 0.001			567	D		780			0.14		
018P2S027	Untreated water in Pond 2 South	4/1/2017	2.83	2.4	31.0			0.238			0.003			18.8			0.079			0.190			0.130			46.6			ND, 0.001			5.1			1.03			0.505			ND, 0.001			377	D		523			0.10		
019P2S029	Untreated water in Pond 2 South	4/3/2017	2.89	1.6	12.5	D		0.052			0.001			9.8			0.030			0.080			0.055			15.8			ND, 0.001			2.1			0.410			0.19	D		ND, 0.001			146			279			0.04		
020P2S032*	Untreated water in Pond 2 South	4/5/2017	2.56	2.11																																															
021P2S033*	Untreated water in Pond 2 South	4/7/2017	2.62	0.00																																															
022P2S034*	Untreated water in Pond 2 South	4/9/2017																																															

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All parameters are dissolved except Selenium which is total recoverable.
All results are preliminary
NP - Not Promulgated
NA - Not Analyzed
* - Analytical results pending
Sample result exceedes USEPA Daily Maximum Discharge Criteria

Data Qualifiers (DQ) from the Laboratory:
D - Analyte reporting limit increased due to sample matrix
L - Lowest available reporting limit for the analytical method used
ND - Not detected at the reporting limit, number following ND represents the reporting limit

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Table 3
2017 Spring Treatment, Leviathan Mine
Pond 3 Discharge Sample Results

SAMPLE ID	Sample Description	SAMPLE DATE	pH	TEMP (°C)	Aluminum			Arsenic			Cadmium			Calcium			Chromium			Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Nickel			Selenium			Sulfate (as SO_4)			Total Dissolved Solids			Zinc		
USEPA Daily Maximum Discharge Criteria			6.0 - 9.0		4			0.34			0.009			NP			0.97			NP			0.026			2			0.136			NP			NP			0.84			NP			NP			NP			0.21		
USEPA 4-Day Average Discharge Criteria			NP		2			0.15			0.004			NP			0.31			NP			0.016			1			0.005			NP			NP			0.094			0.005			NP			NP			0.21		
					Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ	Result	DQ	EQ
002DIS003	Pond 3, Treated discharge	3/4/2017	7.64	0.0	3.16			ND, 0.001			0.002			84.3			ND, 0.005			0.068			0.047			0.11			0.002			19.5			0.471			0.163			0.003			262			361			0.05		
004DIS005	Pond 3, Treated discharge	3/10/2017	8.30	0.0	0.19			0.002			ND, 0.001			362			ND, 0.005			0.015			ND, 0.005			0.12			ND, 0.001			20.2			0.263			0.051			0.008			1040	D		1500			ND, 0.01		
005DIS007	Pond 3, Treated discharge	3/13/2017	7.83	0.0	0.24			0.002			ND, 0.001			231			ND, 0.005			0.029			0.008			0.04			ND, 0.001			8.4			0.291			0.083			0.004			617	D		866			0.01		
007DIS009	Pond 3, Treated discharge	3/16/2017	7.67	0.0	0.11			0.001			ND, 0.001			362			ND, 0.005			0.045			ND, 0.005			ND, 0.02			ND, 0.001			12.2			0.724			0.110			0.003			979	D		1460			ND, 0.01		
009DIS011	Pond 3, Treated discharge	3/18/2017	8.55	0.0	3.35			ND, 0.001			ND, 0.001			209			ND, 0.005			ND, 0.005			ND, 0.005			ND, 0.02			ND, 0.001			9.1			0.036			ND, 0.005			0.005			563	D		862			ND, 0.01		
011DIS013	Pond 3, Treated discharge	3/20/2017	8.64	0.0	0.44			ND, 0.001			ND, 0.001			157			ND, 0.005			0.008			ND, 0.005			ND, 0.02			ND, 0.001			7.5			0.251			0.042			0.004			409	D		623			ND, 0.01		
013DIS015	Pond 3, Treated discharge	3/22/2017	8.80	0.0	0.89			0.001			ND, 0.001			134			ND, 0.005			ND, 0.005			ND, 0.005			ND, 0.02			ND, 0.001			7.0			0.140			0.012			0.003			349	D		560			ND, 0.01		
014DIS017	Pond 3, Treated discharge	3/24/2017	8.52	0.0	3.24			ND, 0.001			ND, 0.001			126			ND, 0.005			ND, 0.005			ND, 0.005			ND, 0.02			ND, 0.001			5.7			0.072			ND, 0.005			0.003			288			479			ND, 0.01		
015DIS019	Pond 3, Treated discharge	3/26/2017	8.29	0.0	2.56			ND, 0.001			ND, 0.001			123			ND, 0.005			ND, 0.005			ND, 0.005			ND, 0.02			ND, 0.001			5.8			0.108			ND, 0.005			0.003			306			493			ND, 0.01		
016DIS021	Pond 3, Treated discharge	3/28/2017	8.38	1.4	0.52			ND, 0.001			ND, 0.001			129			ND, 0.005			0.005			ND, 0.005			ND, 0.02			ND, 0.001			6.2			0.183			0.014			0.002			304			487			ND, 0.01		
017DIS023	Pond 3, Treated discharge	3/30/2017	8.22	3.5	ND, 0.03			0.002			ND, 0.001			152			ND, 0.005			0.020			ND, 0.005			0.19			ND, 0.001			7.6			0.466			0.052			0.002			406	D		602			ND, 0.01		
018DIS026	Pond 3, Treated discharge	4/1/2017	8.44	2.07	0.09			0.001			ND, 0.001			163			ND, 0.005			0.019			ND, 0.005			ND, 0.02			ND, 0.001			7.4			0.362			0.070			0.001			431	D		656			ND, 0.01		
019DIS028	Pond 3, Treated discharge	4/3/2017	8.71	6.55	1.01			ND, 0.001			ND, 0.001			119			ND, 0.005			ND, 0.005			ND, 0.005			ND, 0.02			ND, 0.001			5.1			0.110			0.020			0.002			314			491			ND, 0.01		
020DIS030*	Pond 3, Treated discharge	4/5/2017	8.20	5.95																																															
020 DID031*	Pond 3, Treated discharge, Duplicate Sample	4/5/2017	8.20	5.95																																															
021DIS032*	Pond 3, Treated discharge	4/7/2017	8.27	4.11																																														
022DIS033*	Pond 3, Treated discharge	4/9/2017	8.23	0.00																																														

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Sample result exceedes USEPA Daily Maximum Discharge Criteria

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Table 4
2017 Spring Treatment, Leviathan Mine
Manual Remaining Freeboard Measurements

Date	Pond	Remaining Freeboard (ft)	Precipitation	Approximate Combined Adit and PUD flow (gpm)
3/9/2017	Pond 2 South	0.29		
3/20/2017	Pond 2 South	0.35		
3/22/2017	Pond 2 South	0.28		
3/23/2017	Pond 2 South	0.30		
3/27/2017	Pond 2 South	0.32		
3/28/2017	Pond 2 South	0.40		
3/29/2017	Pond 2 South	0.42		
3/30/2017	Pond 2 South	0.40	Yes	80
4/3/2017	Pond 2 South	0.35	No	85
4/4/2017	Pond 2 South	0.36	No	85
4/5/2017	Pond 2 South	0.35	No	94
4/6/2017	Pond 2 South	0.35	No	100
4/7/2017	Pond 2 South	0.14	Yes	107
4/9/2017	Pond 2 South	0.0	No	107
4/10/2017	Pond 2 South	0.0	No	107

Figure 1 - Leviathan Mine Pond Stage